

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π-MOSV)

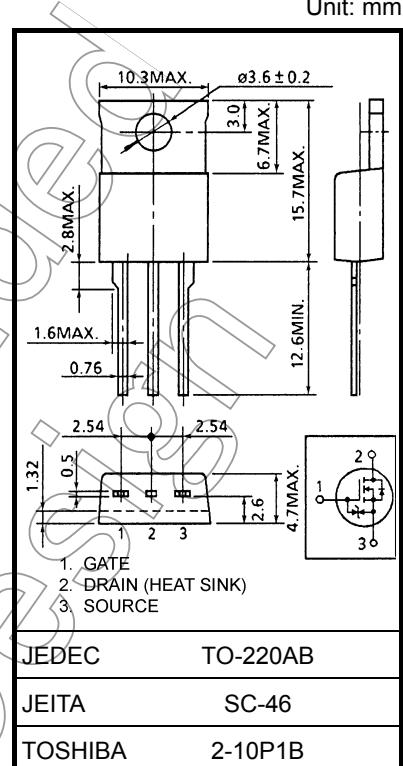
2SK2542

Switching Regulator Applications

- 4-V gate drive
- Low drain-source ON-resistance : $R_{DS\ (ON)} = 0.75\ \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 7.0\ S$ (typ.)
- Low leakage current : $ID_{SS} = 100\ \mu A$ (max) ($V_{DS} = 500\ V$)
- Enhancement mode : $V_{th} = 2.0$ to $4.0\ V$ ($V_{DS} = 10\ V$, $I_D = 1\ mA$)

Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	500	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)	V_{DGR}	500	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	A
Drain power dissipation ($T_c = 25^\circ C$)	P_D	80	W
Single pulse avalanche energy (Note 2)	E_{AS}	312	mJ
Avalanche current	I_{AR}	8	A
Repetitive avalanche energy (Note 3)	E_{AR}	8	mJ
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature range	T_{stg}	-55 to 150	$^\circ C$



Weight: 2.0 g (typ.)

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th\ (ch-c)}$	1.56	$^\circ C / W$
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	83.3	$^\circ C / W$

Note 1: Ensure that the channel temperature does not exceed $150^\circ C$.Note 2: $V_{DD} = 90\ V$, $T_{ch} = 25^\circ C$ (initial), $L = 8.3\ mH$, $R_G = 25\ \Omega$, $I_{AR} = 8\ A$

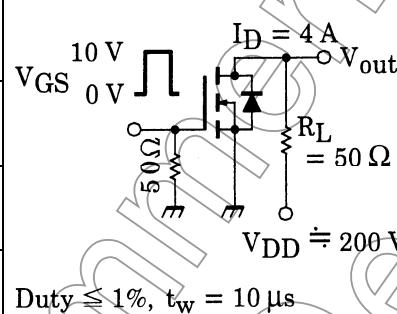
Note 3: Repetitive rating: pulse width limited by maximum channel temperature

This transistor is an electrostatic-sensitive device.

Please handle with caution.

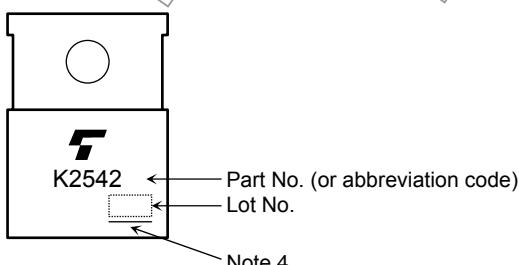
Electrical Characteristics ($T_a = 25^\circ C$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 25 V, V_{DS} = 0 V$	—	—	± 10	μA
Gate-source breakdown voltage	$V_{(BR) GSS}$	$I_G = \pm 10 \mu A, V_{DS} = 0 V$	± 30	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 500 V, V_{GS} = 0 V$	—	—	100	μA
Drain-source breakdown voltage	$V_{(BR) DSS}$	$I_D = 10 mA, V_{GS} = 0 V$	500	—	—	V
Gate threshold voltage	V_{th}	$V_{DS} = 10 V, I_D = 1 mA$	2.0	—	4.0	V
Drain-source ON-resistance	$R_{DS (ON)}$	$V_{GS} = 10 V, I_D = 4 A$	—	0.75	0.85	Ω
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 V, I_D = 4 A$	3.5	7.0	—	S
Input capacitance	C_{iss}	$V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz$	—	1300	—	pF
Reverse transfer capacitance	C_{rss}		—	130	—	
Output capacitance	C_{oss}		—	400	—	
Switching time	Rise time	t_r	—	26	—	ns
	Turn-on time	t_{on}	—	45	—	
	Fall time	t_f	—	40	—	
	Turn-off time	t_{off}	—	140	—	
Total gate charge (Gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400 V, V_{GS} = 10 V, I_D = 8 A$	—	30	—	nC
Gate-source charge	Q_{gs}		—	17	—	
Gate-drain ("miller") charge	Q_{gd}		—	13	—	

Source-Drain Ratings and Characteristics ($T_a = 25^\circ C$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	8	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	32	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 8 A, V_{GS} = 0 V$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 8 A, V_{GS} = 0 V$ $dI_{DR} / dt = 100 A / \mu s$	—	1200	—	ns
Reverse recovery charge	Q_{rr}		—	10	—	μC

Marking

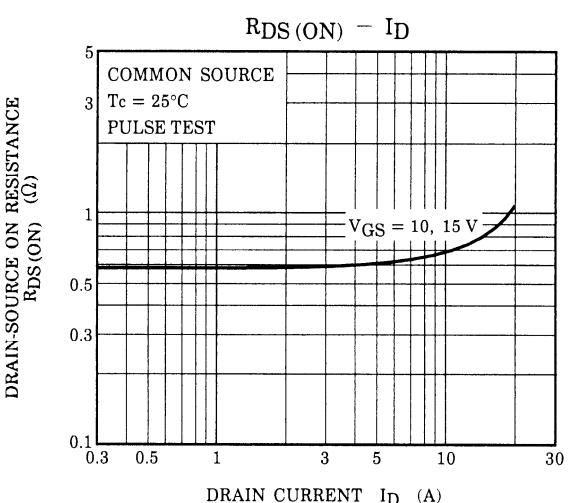
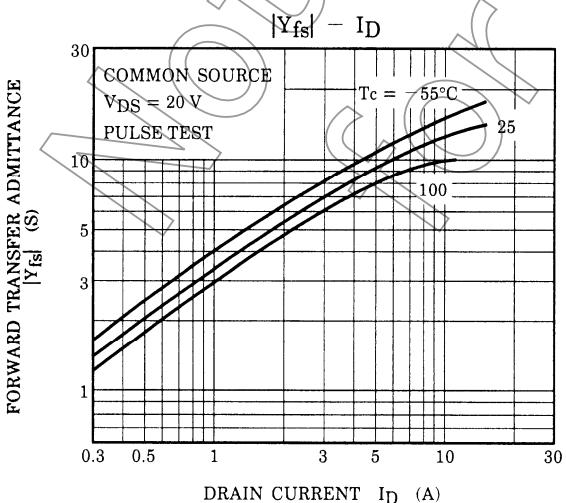
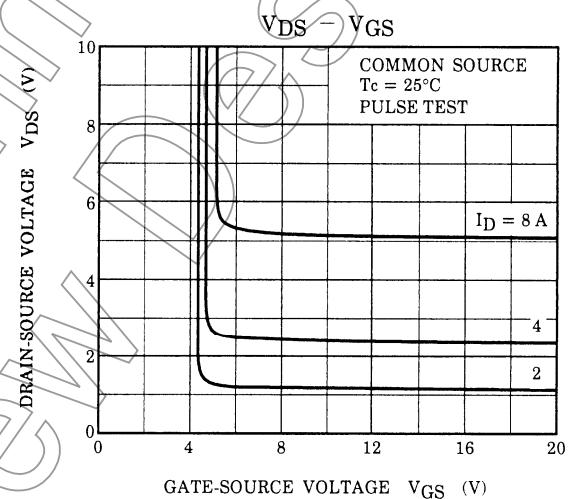
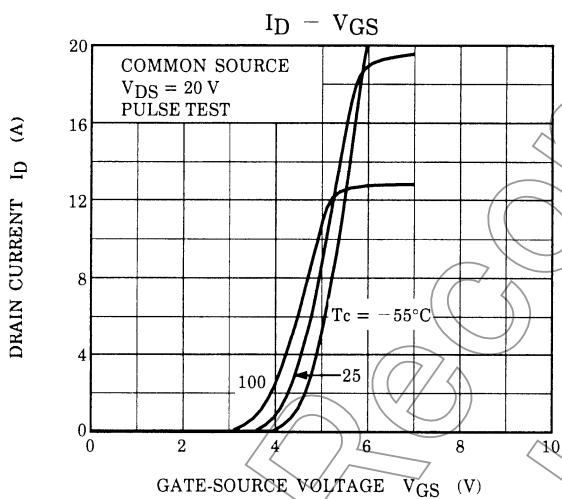
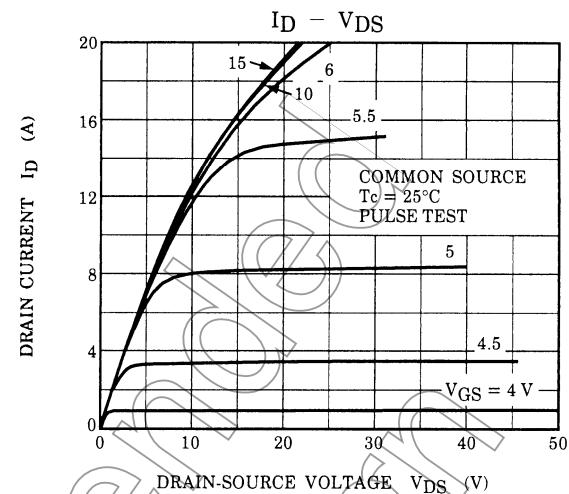
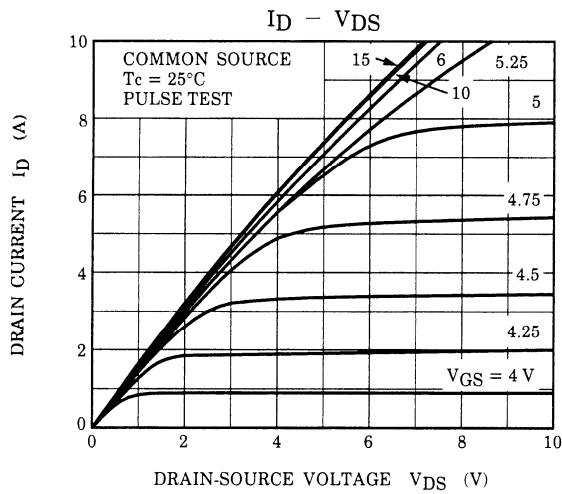


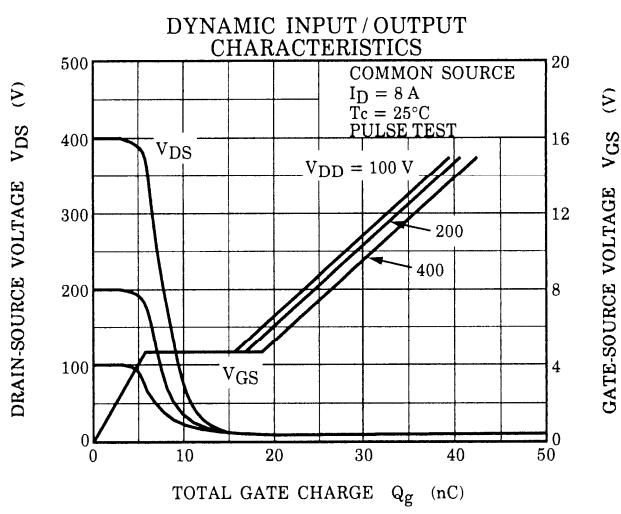
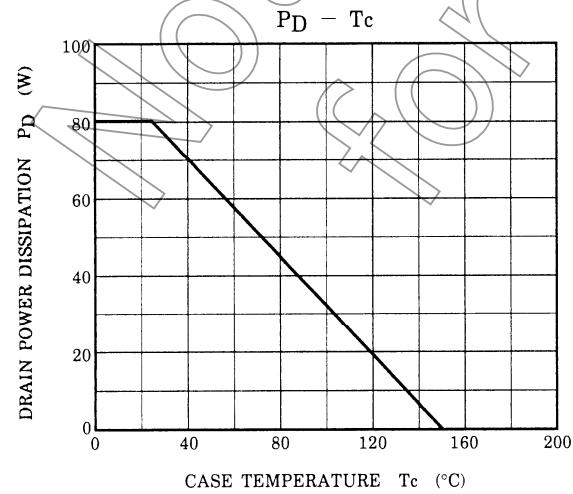
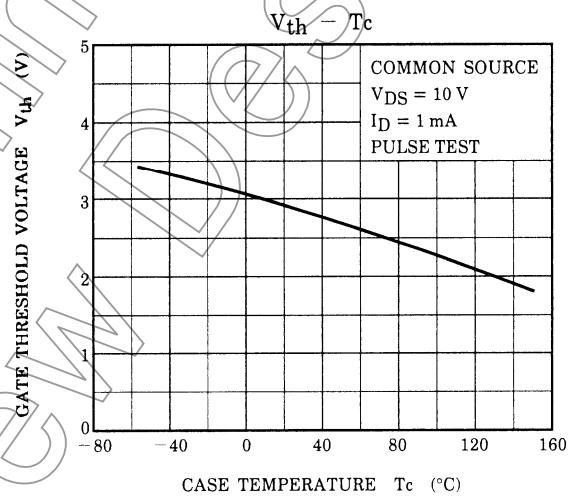
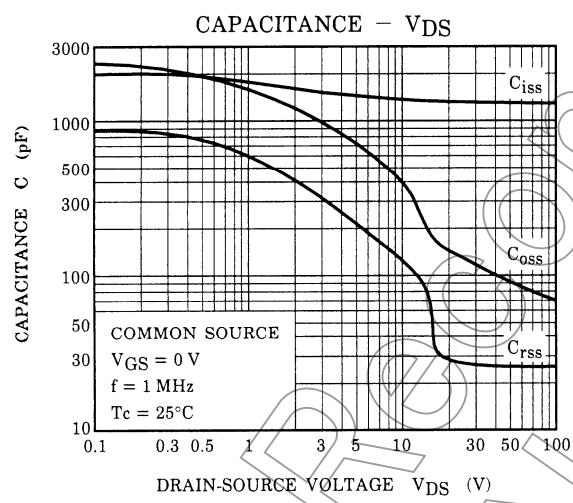
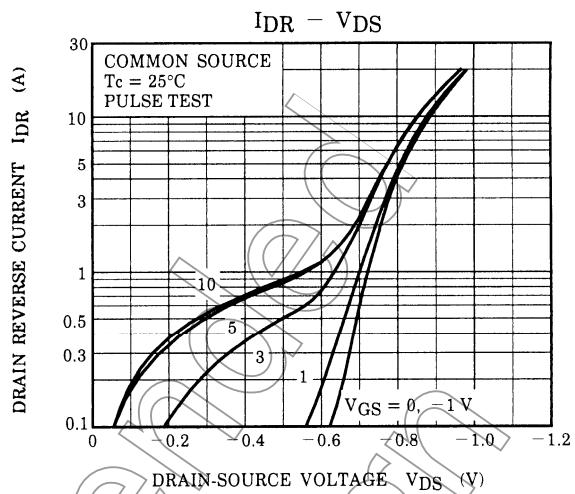
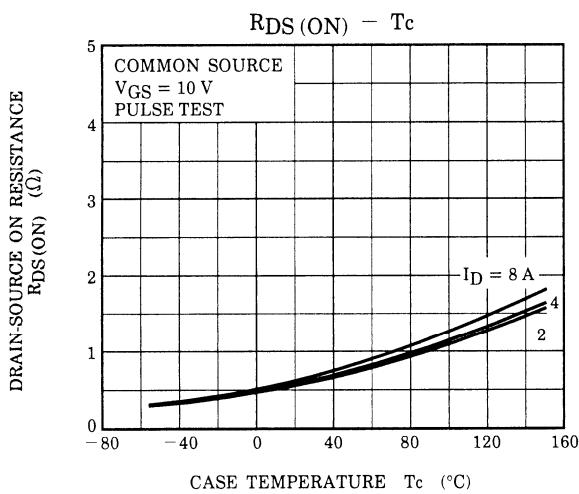
Note 4: A line under a Lot No. identifies the indication of product Labels.

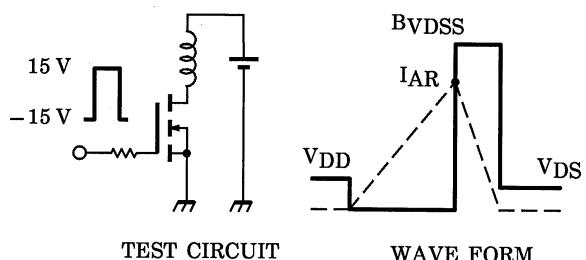
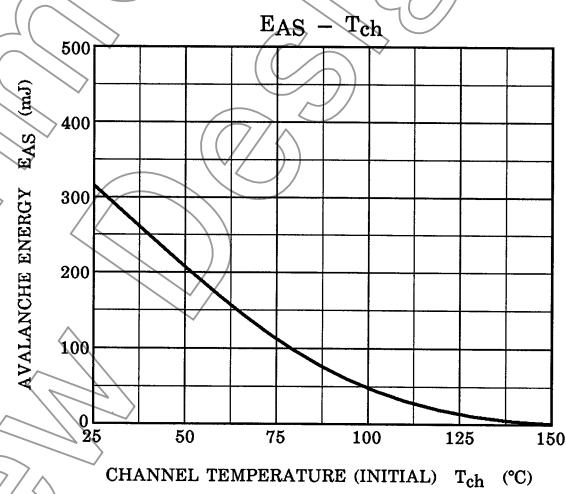
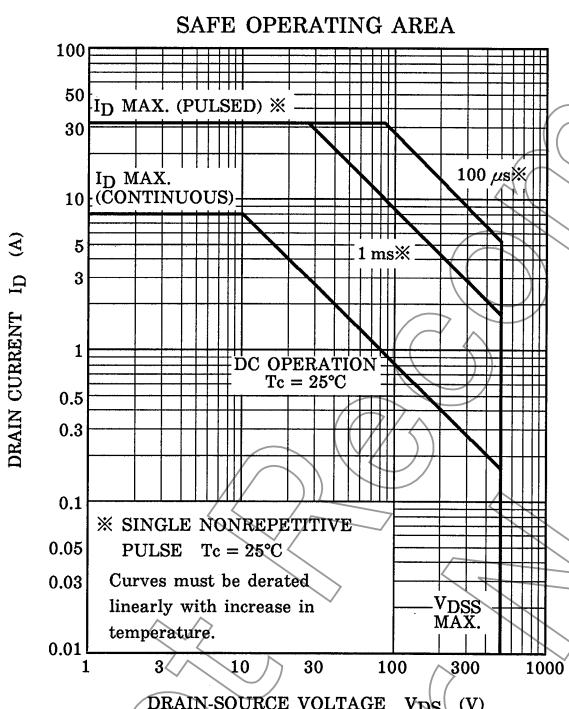
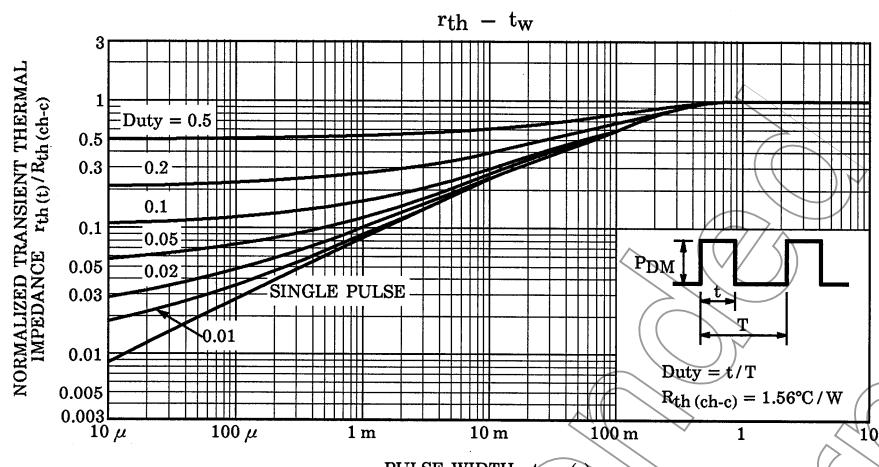
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